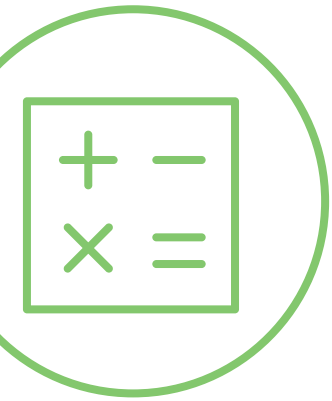
MONITORING TRENDS IN EDUCATIONAL GROWTH

CLASS 6 SCHOOL FACTORS IN AFGHANISTAN 2013

THE RELATIONSHIP BETWEEN SCHOOL FACTORS AND STUDENT OUTCOMES FROM A LEARNING ASSESSMENT OF MATHEMATICAL, READING AND WRITING LITERACY

Australian Council *for* Educational Research

ACER

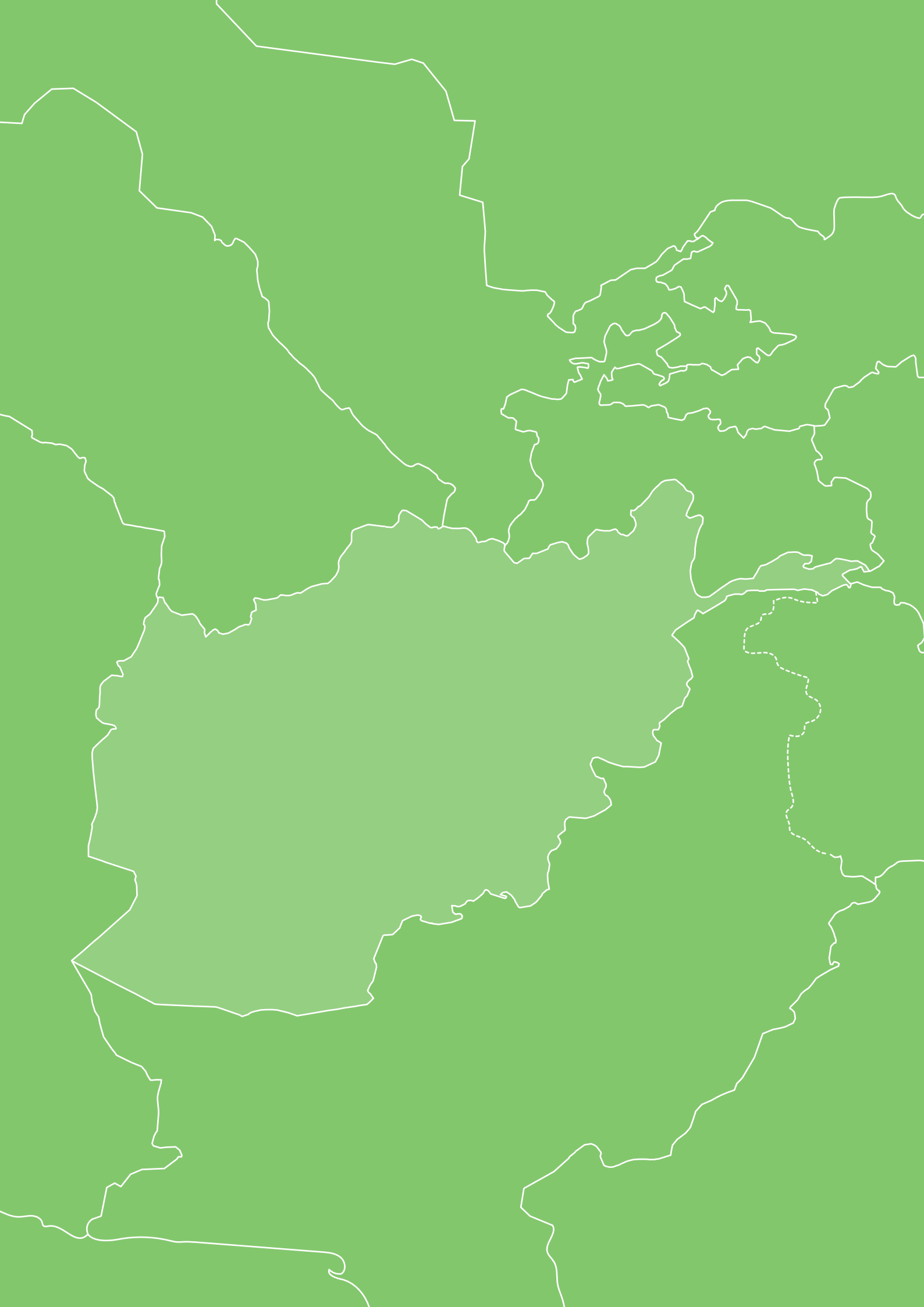


MONITORING TRENDS IN
EDUCATIONAL GROWTH

CLASS 6
SCHOOL FACTORS IN AFGHANISTAN 2013

THE RELATIONSHIP BETWEEN SCHOOL FACTORS AND STUDENT OUTCOMES FROM A LEARNING ASSESSMENT OF MATHEMATICAL, READING AND WRITING LITERACY

TIM FRIEDMAN
SALLY ROBERTSON
STEPHANIE TEMPLETON
MAURICE WALKER



This report has been prepared for the
Ministry of Education, Islamic Republic of Afghanistan.

Ministry of Education
Islamic Republic of Afghanistan

First published 2016
by Australian Council for Educational Research Ltd
19 Prospect Hill Road, Camberwell, Victoria, 3124, Australia

www.acer.edu.au

Cover design, text design and typesetting by ACER Creative Services

National Library of Australia Cataloguing-in-Publication entry

Creator:	Friedman, Tim, author.
Title:	Class 6 school factors in Afghanistan 2013: the relationship between school factors and student outcomes from a learning assessment of mathematical, reading and writing literacy / Tim Friedman; Sally Robertson; Stephanie Templeton; Maurice Walker.
ISBN:	9781742862897 (paperback)
	9781742862903 (ebook)
Series:	Monitoring trends in educational growth (MTEG) reports (Australian Council for Educational Research)
Subjects:	Educational tests and measurements--Afghanistan.
	Reading–Ability testing–Afghanistan.
	Mathematical ability–Testing–Afghanistan.
	Writing–Ability testing–Afghanistan.
Other Creators/Contributors:	Robertson, Sally, author.
	Templeton, Stephanie, author.
	Walker, Maurice, author.

Australian Council for Educational Research. Global Education Monitoring.
Afghanistan. Ministry of Education. Learning Assessment Unit.
Dewey Number: 371.3609581

Acknowledgements

The MTEG 2013 assessment of Class 6 students in Afghanistan was a collaboration between the Centre for Global Education Monitoring at the Australian Council for Educational Research (ACER-GEM) and the Ministry of Education, Afghanistan. The key staff involved are acknowledged here.

Dr. Seddiq Weera, Strategic Advisor to the Minister of Education
Prof. Ustad Naeem Baheen, Director General, General Education, Ministry of Education
Dr. Amir Mansory, Professor of Education
Dr. Amir Mohammad, Director of EQUIP

Learning Assessment team
Prof. Aminullah Amin (Coordinator)
Mujihid Karimi (Research Officer)
Khan Wali Khan (Research Officer)
Nosheen Yasheen (Research Officer)
Yama Yayha (Administrative/Finance Officer)

Technical Support to the Learning Assessment team
Farahnaz Farah (National Technical Advisor)
Hafeez Samo (ITA) – until September 2013

Test Administrators
Mursal Ahrari
Ahmad Zubair Badri
Abdul Wahid Erfan
Gul Hakim
Noorullah Haqmal
Mohammad Jawid Norzoy
Emal Safir
Jamshid Sherzad
Mohammad Salim Sunny
Mohammad Rahim Taroon
Sulaiman Zadran
Shafiqa Nikzad Zahid
Mohammad Khalid Zaland

Australian Council for Educational Research
Ray Adams (Technical advisor)
Mark Butler (Test development)
Alexander Daraganov (Data analysis)
Alan Egbert (Operations management)
Tim Friedman (Data analysis/Questionnaire development)
Musab Hayatli, cApStAn (Linguistic quality control)
Nora Kovarcikova (Survey operations)
Winson Lam (IT services)
Petra Lietz (Questionnaire development)
John Lindsey (Test development)
Tom Lumley (Test development and reporting)
Greg Macaskill (Data analysis)
Juliette Mendelovits (Test development and reporting)
Martin Murphy (Sampling)
Alla Routitsky (Data analysis)
Rachel Stanyon (Reporting)
Sally Robertson (Reporting)
Stephanie Templeton (Project administration)
Ross Turner (Test development and reporting)
Sam Venables (IT services)
Maurice Walker (ACER project director)

Thanks are also extended to the many other individuals involved, including school staff, those who contributed to the many aspects of materials development and delivery, and the students who participated.

The critical support of sponsors is also acknowledged, in particular World Bank staff and associates Samantha de Silva, Aman Farahi, Abdul Hai Sofizada and Poul Erik Rasmussen.

The authors would like to acknowledge the use of work by Tom Lumley, Juliette Mendelovits, Rachel Stanyon, Ross Turner and Maurice Walker, originally published in Class 6 Proficiency in Afghanistan 2013 (Lumley, Mendelovits, Stanyon, Turner, & Walker, 2015).

Contents

Overview

Background

In 2012, the Ministry of Education, Afghanistan, engaged the Australian Council for Educational Research (ACER) as a partner to support the development of a national learning assessment program in Afghanistan. To achieve this goal, the Learning Assessment Unit of the Ministry of Education and ACER collaborated to design and implement the Monitoring Trends in Educational Growth (MTEG) program in Afghanistan.

MTEG is designed as a long-term monitoring program with one focus on trends in achievement outcomes in single classes over time, and another focus on the growth of achievement in cohorts throughout the school cycle, from Class 3 through to Class 9.

The Afghan Ministry of Education's curriculum goals speak of students' learning skills such as 'reading and writing, using numbers', and of utilising those skills to support 'thinking, reasoning, study, research, diagnosis and innovation in academic, literary, cultural and technical contexts' and in the 'solving and identification [of] individual and social problems' (Afghanistan Ministry of Education, 1390 [2011], pp. 116-117). These goals are reflected in MTEG's literacy approach to the assessment of mathematics, reading and writing. The term literacy denotes the ability to apply knowledge, skills and understanding across a range of contexts, both within school and in extra-curricular settings. Rather than limiting its focus to set topics laid out in a curriculum, in MTEG the domains of mathematics, reading and writing are assessed through tasks that require *authentic use of knowledge* (Turner, 2014). Similarly, the Afghanistan Education Curriculum highlights the importance of being able to 'use the acquired knowledge and skills in solving daily problems' at Class 6 level (Afghanistan Ministry of Education, 1390 [2011], pp. 116-117). The literacy orientation underpins an approach that is both curricular and cross-curricular. The assumptions behind a literacy approach to assessment are explained in more detail in *An Assessment Framework for Monitoring Trends in Educational Growth* (ACER, in press).

Exhibit 1: Educational goals of the Afghanistan Education Curriculum

Acquiring and strengthening the learning skills [of] listening, speaking, reading and writing, using numbers and calligraphy in national and foreign languages.

Promoting and strengthening the abilities of thinking, reasoning, study, research, diagnosis and innovation in academic, literary, cultural and technical contexts.

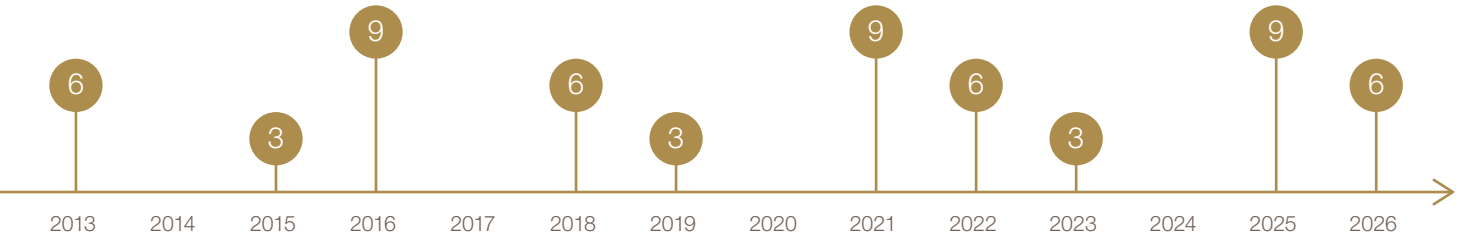
Gaining skills for solving and identification [of] individual and social problems.

(Afghanistan Ministry of Education, 1390 [2011], pp. 30)

As can be seen from the MTEG assessment schedule below, the first assessment of Class 6 students took place in 2013. Another assessment of Class 6 students is planned for 2018, which will allow for measuring trends in Class 6 achievement over time. In addition to measuring class achievement, as Exhibit 2 shows, growth in achievement is measured by testing the same cohort as it progresses through class levels: the cohort tested in Class 3 in 2016 will be the same cohort tested in Class 6 in 2018, and again in Class 9 in 2021. Thus, the design of the program allows for conclusions to be drawn about changes in the achievement of Class 6 students at regular intervals, as well as about changes in achievement as students progress from class level to class level.

It is the data from the school questionnaire administered to principals at schools participating in the 2013 assessment of Class 6 students that are the focus of this report.

Exhibit 2: MTEG assessment schedule in Afghanistan



Terminology and conventions used in this report

Reporting of student data

The report uses 'Class 6' students as shorthand for the MTEG Afghanistan 2013 target population. The target population is defined as Class 6 students (taught in Dari or Pashto) from government schools in 13 Afghan provinces.

The figures in this report are estimates that apply to the Class 6 population. To obtain these estimates, the sample data is weighted to the estimated number of students in the Class 6 population.

Rounding

All statistics, including their totals and differences, are rounded for reporting purposes. Because of rounding, some figures in some tables may appear inconsistent.

Where a value of 0 is reported it means that the value is less than 0.05.

Statistical significance

Statistical significance shows that the differences identified are likely to be reflected in the population, rather than being the result of the random nature of the data.

The 95% confidence level is used throughout this report to compute confidence intervals and statistical significance.

Differences which are statistically significant and positive are identified by a triangle 'Δ'; the differences that are statistically significant and negative are identified by an inverted triangle '∇'; and the differences that are not statistically significant are identified by a dash '–'.

Standard errors are not published here but will be available in the technical report.

Correlation

A correlation coefficient shows the strength of association between two variables. The correlation coefficient ranges from -1 to 1, with 0 meaning there is no correlation, values greater than 0 showing positive correlation, and values less than 0 showing negative correlation.

For ease of discussion, the following descriptions will be used in this report when the correlation coefficient is statistically significant:

- Correlations of 0.5 and higher are considered to be moderate to strong.
- Correlations lower than 0.5 are considered to be weak to moderate.

The same scale and descriptions are used for negative correlations (eg -0.5 or less is a moderate to strong negative correlation).

Acronyms

ACER	Australian Council for Educational Research
MTEG	Monitoring Trends in Educational Growth
PISA	Project for International Student Assessment

Key Points for MTEG Afghanistan 2013

Purpose

MTEG is designed as a long-term monitoring program.

One focus of MTEG is on trends in achievement outcomes in single classes over time.

Another focus is on the growth of achievement in cohorts throughout the school cycle, from Class 3 through to Class 9.

Methods

In total, 110 schools and 5,979 students participated in the assessment, representing 361,172 students estimated to be in the Class 6 population across the 13 provinces.

Each participating student undertook a one-and-a-half-hour test and a background questionnaire of approximately half an hour.

The test contained tasks relating to mathematical, reading and writing literacy – about 30 minutes of test material per domain.

The student questionnaire contained questions about the student, his or her family, living conditions, and attitudes towards school, reading, and mathematics.

In addition, the principals of participating schools filled in a school questionnaire including questions about the principal, the teachers, and the school's facilities and resources.

Publications

Along with the technical report and assessment framework, a number of short topical reports for the general public are included in the series being published by ACER in 2015 in conjunction with the 2013 MTEG Afghanistan assessment.

The topics include:

- Class 6 proficiency
- Class 6 girls and boys
- School factors

The relationship between school factors and student outcomes from the 2013 Class 6 assessment in mathematical, reading and writing literacy are the main topic of this report (School factors).

Database

The 2013 Class 6 data is available for research purposes at this address http://www.acer.edu.au/gem/activities/mteg/products

Future assessments

The MTEG program design includes assessments of Class 3 and Class 9 students in Afghanistan, as well as ongoing assessment of Class 6. It is envisaged that the program will expand to implementation in other countries.

The sample

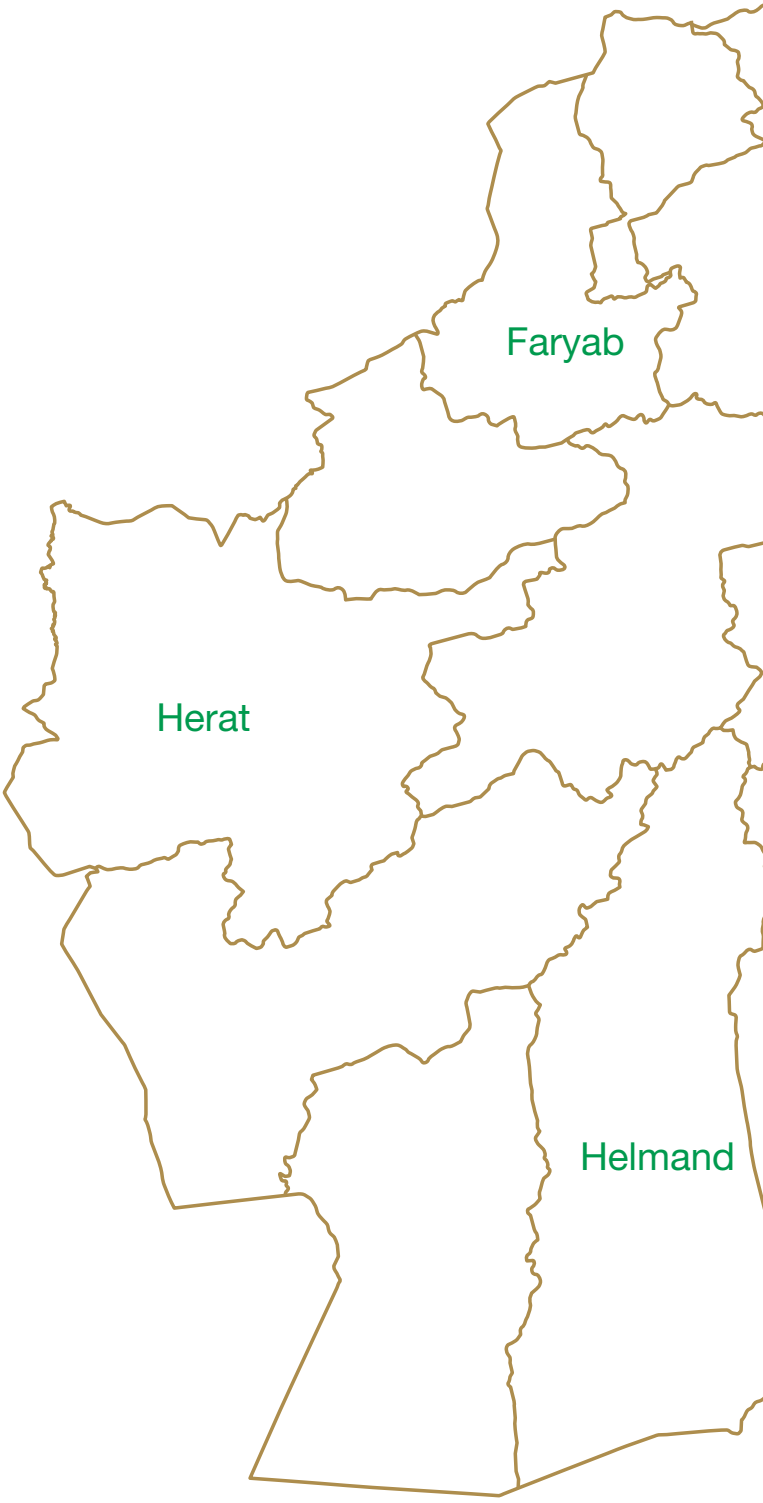
Schools from 13 provinces in Afghanistan participated in the assessment. The provinces included are broadly representative of the five main regions of Afghanistan: East, West, Central, North and South. The 13 provinces are Balkh, Bamyan, Faryab, Helmand, Herat, Kabul Province, Kabul City, Kandahar, Khost, Kunduz, Nangarhar, Paktia, and Parwan.

Using statistical methods[1], schools from these provinces were randomly sampled to participate in the study. From each randomly sampled school, one randomly sampled section of Class 6 students was administered the assessment.

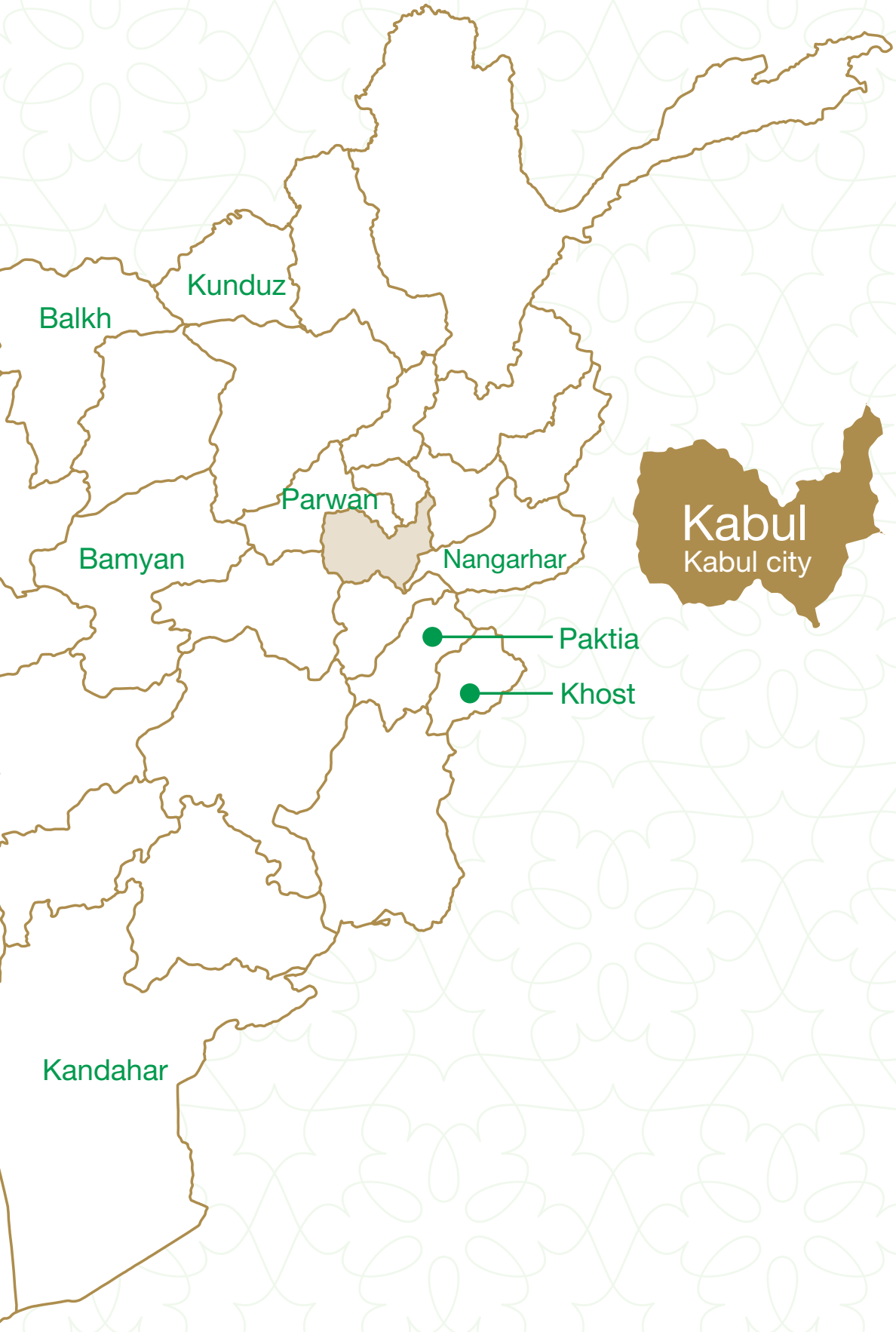
Girls made up about 42% of the sample and boys 58%. This closely matches the estimated proportions in the population in Class 6 across Afghanistan.

The proportion of participating students tested in Dari was 54% with 46% of students tested in Pashto.

Exhibit 3: Provinces participating in the MTEG Class 6 Afghanistan survey in 2013



1 The sample frame was based on schools with Class 6 students listed on the Ministry of Education's Education Management Information System (EMIS). More detailed descriptions of the statistical methods used will be provided in future publications.


Kunduz
Balkh
Parwan
Bamyan
Nangarhar
Kabul
Kabul city
Paktia
Khost
Kandahar

Introduction

This report presents data on school factors in relation to student outcomes from the 2013 Class 6 assessment in mathematical, reading and writing literacy.

The purpose of MTEG is to provide information to *education policy makers* on the quality of education outcomes in Afghanistan. In addition, MTEG will inform *educational practitioners* by clearly demonstrating what students at Class 6 can and cannot do in an assessment situation.

The assessment results are complemented with data from two contextual questionnaires – one student questionnaire completed by Class 6 students, and one school questionnaire completed by principals. These questionnaires provide important information about factors at the school and student levels that may influence achievement outcomes.[2] The Class 6 achievement outcomes are discussed in *Class 6 Proficiency in Afghanistan 2013* (Lumley, et al., 2015).

Data from the questionnaire completed by students participating in the Class 6 assessment identifies a range of background characteristics that may interact with school attendance and achievement. These background characteristics include students' attitudes towards reading, perceived support for learning, and a series of socio-economic status indicators. For a discussion of a selection of background characteristics and attitudes of Class 6 students in Afghanistan and their relationship to achievement, see *Class 6 Girls and Boys in Afghanistan 2013* (Routitsky, Stanyon, & Walker, 2015).[3]

In addition, the data gathered from the school questionnaire completed by principals from schools participating in the Class 6 assessment provides information to education policy makers, donors, and educational practitioners on school-related background factors that may be associated with student achievement outcomes. Previous studies have shown that school-related factors have a large influence on how students perform. These factors include aspects of school policies (for example, monitoring of student attendance and levels of student achievement), as well as the resources available to a school – both physical resources, such as the presence of basic facilities like electricity and water (ACER & ZIMSEC, 2015; Majgaard & Mingat, 2012), and pedagogical resources, such as teachers appropriately trained at the pre-service and in-service stages (Collins et al., 2012; Ministry of Education Science and Technology of Malawi, 2014).

This report will explore the relationship between school-related factors and student achievement outcomes for Afghanistan. The school questionnaire was designed to collect key information on the characteristics of teachers and schools as well as on school policies and resources. Before the findings are presented, the report will first discuss a range of data and analysis considerations that should be taken into account when interpreting and utilising the findings of this report.

2 The forthcoming Assessment Framework (ACER, in press) for the study provides the conceptual underpinning of all factors contained within these questionnaires.

3 Further information relating to student level indicators will be presented in the forthcoming technical report.

Questionnaire data and analysis considerations

When making interpretations based on the report, there are a number of considerations to be taken into account. Completed questionnaires were received from respondents representing 132 schools. Of these schools, 110 could be matched to student data.[4] This means that linking school characteristics to student outcomes was possible for 83% of schools, representing 81% of the student population.[5] The analyses in this report primarily present data from the Afghanistan Class 6 school questionnaire in relation to student achievement outcomes. Achievement data is available for the domains of mathematical, reading and writing literacy. The scales for each of these three domains were developed separately and are thus not directly comparable with each other.

By using student sampling weights we estimate the proportions of students attending schools for each school factor under investigation. For example, when reporting data on the location of school, we can say that 36% of students attended schools that the principal indicated was located in a rural area. This is notably different from saying that 36% of principals surveyed indicated their school was located in a rural area.

The questionnaire was designed to be completed by the school principal, or the person taking on the principal's role (e.g. vice principal, head teacher, supervisor) if the principal was absent at the time of data collection. The data indicate that the majority of respondents were in fact the principal, but approximately one-quarter were completed by someone on their behalf. Throughout the report, respondents to the school questionnaire will be referred to as 'principals'.

The effect of socio-economic status on the findings

The results show several school characteristics, policies and resources that are associated with higher achievement levels of students. Schools with students that have higher achievement levels are better resourced and the students attending these schools tend to come from families that have access to greater resources. This is supported by a range of analyses that take into account selective school factors, such as the physical resources of the school, as well as selective student factors based on the student's home and school-based possessions and even the materials used to construct their house.[6]

Other findings from the report suggest that the characteristics of a community, such as whether the school is in an urban or rural setting and the relative distance the school is from other community facilities, are associated with achievement. Again the resourcing available to both students and schools appears to help explain much of this association.

Details about questions included in the student questionnaire related to the students' socio-economic background are presented in Exhibit 4.

4 Issues arising during the field operations stage of the survey resulted in questionnaires being received that could not be identified back to the school. Procedural improvements were made to data collection for subsequent MTEG surveys.

5 To confirm the representativeness of the subsample analyses were run comparing student achievement and questionnaire data that could be matched to schools. The results of these analyses were that the two data sets are similar. Information relating to these analyses will be presented in the forthcoming technical report. While analyses in this report only include those schools that can be matched to student data, caution should still be taken when interpreting the results.

6 The results from the multi-level model, taking into account these influences, will be presented in full in the forthcoming technical report.

Exhibit 4: Questionnaire indices related to socio-economic background of Class 6 students[7]

Index	Questions used from the student and school questionnaires
Home Possessions	16 items from the student questionnaire about things students have in their home, e.g. 'Daily newspaper', 'Car', and 'Piped water'.
Home Quality	Four items from the student questionnaire about students' houses, e.g. 'In your home, what is the main source of lighting by which you can read?' and 'What is the **roof** of your home **mostly** made of?'
Educational Possessions	13 items from the student questionnaire about reading, mathematics, and other educational materials that students have, e.g. 'How many books are in your home that are not school books, newspapers or magazines?' and a question that asks about items possessed, e.g. 'Calculator' and 'Pencil'.
School Resources	Eight items from the school questionnaire about resources at schools relating to infrastructure for basic needs and other miscellaneous school facilities (see School Resources section for further details about these items).

7 Home and Educational Possessions indices were scaled under Rasch (Rasch, 1960/1980); Home Quality was scaled under a partial credit model (Masters, 1982). Full details about the scaling process used for these socio-economic background variables will be provided in the forthcoming technical report for the study.

School characteristics

Students attending schools in urban settings have higher levels of achievement in reading and writing literacy than students from non-urban settings.

The greater the distance of a student's school from community facilities, especially shopping centres/marketplaces, the more likely it is that the student will have lower achievement in reading and writing.

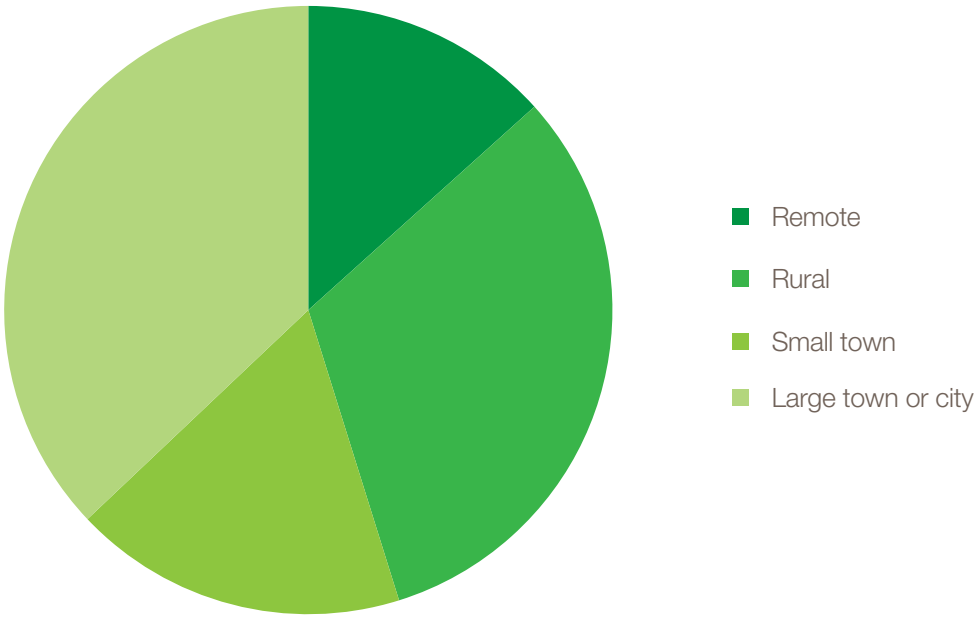
Students whose language of instruction at school is the same as their main language spoken at home have higher achievement in writing literacy.

The school questionnaire contained a series of questions about the schools' location and language of instruction at the school. This section presents the results from these questions.

School location

Principals were asked to choose an option that best described the location of their school ('Remote', 'Rural', 'In or near a small town', or 'In or near a large town or city'). The proportions of students attending schools in these four location types are presented in Exhibit 5. More than a third of the population (37%) attended schools that were in or near a large town or city, and just under a third attended schools in a rural area (32%). Smaller proportions of students attend schools in small town (18%) and remote settings (13%).

Exhibit 5: Proportion of Class 6 students attending schools by location type



Students who attended schools identified as remote, rural or in or near a small town were grouped together ('non-urban') in order to compare their achievement with students who attended schools in or near a large town or city ('urban'). This grouping was made conceptually based on expected differences between big cities such as Kabul and other areas. Achievement for these groups in mathematical, reading and writing literacy is presented in Exhibit 6.

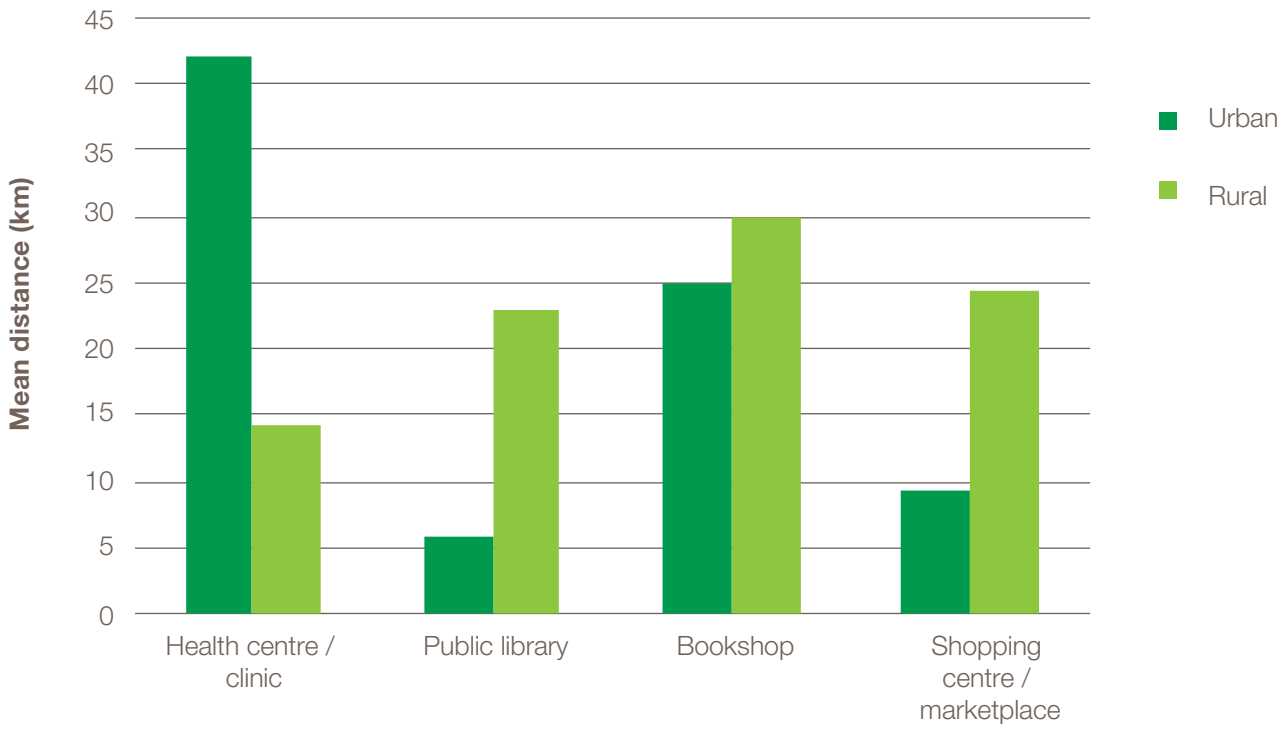
Students attending schools in an urban location were found to have significantly higher levels of achievement in reading and writing literacy than students attending school in a non-urban location, although the magnitude of the differences were relatively small. As stated earlier, it is important to note that once the socio-economic differences of the schools and students from these areas were taken into account, these differences were no longer significant. The results showed no difference in achievement in mathematical literacy between students attending non-urban and urban schools. More details on the relationship between achievement and location can be found in *Class 6 Gender in Afghanistan 2013* (Routitsky, et al., 2015) and in the forthcoming technical report.

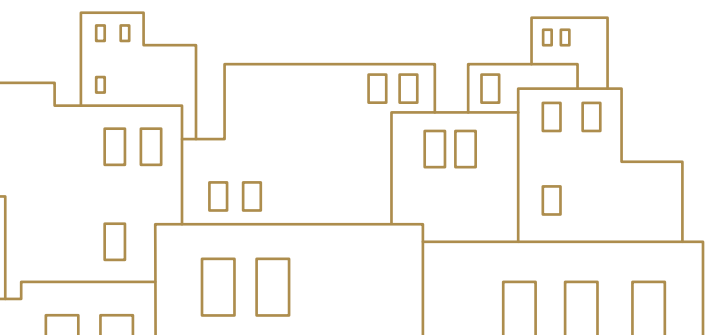
Exhibit 6: Mean achievement by school location

	Non-urban (Remote, rural, in or near a small town)	Urban (In or near a large town or city)	Difference Urban – Non-urban	Statistical significance
Mean Mathematics Achievement	199	201	3	–
Mean Reading Achievement	197	203	6	Δ
Mean Writing Achievement	196	205	9	Δ

Principals were also asked to indicate the distance from their school to their nearest health centre / clinic, public library, bookshop and shopping centre or marketplace. The mean distance of each of these community facilities is presented in Exhibit 7, as a function of school location. As can be seen below, the average distance of community facilities varies according to school location.

Exhibit 7: Mean distance of school from community facilities





While the average distance to a health centre / clinic was higher for schools in an urban area, the distance to a public library, a bookshop and a shopping centre / marketplace was, on average, shorter.

The data also indicates that there are relationships between the distance of these community facilities from a student's school and student achievement. The results show that the further a student's school is from a health centre / clinic[8] or a bookshop[9], the lower their achievement in writing literacy. In statistical terms, this means that distances between schools and community facilities have a weak to moderate negative correlation with writing achievement.

A weak to moderate negative association was also found between the distance to a public library and achievement in both reading and writing literacy: the further a student's school is located from a library, the lower their achievement in reading and writing literacy.[10]

Correspondingly, the further away a shopping centre / marketplace is from a student's school, the more likely it is that they will have lower achievement in reading and writing literacy.[11] This negative correlation is moderate to strong.

No relationship was found between the distance to any of these facilities and student achievement in mathematics. This finding suggests that achievement in mathematics may be more robust to the effects of school location than reading or writing literacy.

Interestingly, the average distance to the nearest health centre / clinic was smaller for students attending schools in a non-urban area, while the opposite was found for public libraries, bookshops and a shopping centre or market place.

Language of instruction

Principals were asked to indicate whether the language of instruction at their school was Dari, Pashto or another language. All principals indicated that either Dari or Pashto was the language of instruction at the school. When combined with the data from the student questionnaires, this showed that 82 per cent of students received instruction at school in the same language as they speak at home. Exhibit 8 shows the mean achievement of students based on whether their home language is, or is not, the same as the language of instruction at their school.

For mathematics and reading, there were no differences in achievement between students who were taught in the same language they spoke at home and those who were taught in a different language to that spoken at home. On average in writing, students taught in the same language spoken at home performed slightly above the overall mean of 200. On average, students taught in a language different to their main language spoken at home performed slightly below the overall mean in writing.

8 Writing literacy: r = -0.40

9 Writing literacy: r = -0.27

10 Reading literacy: r = -0.21; writing literacy: r = -0.36

11 Reading literacy: r = -0.55; writing literacy: r = -0.68

Exhibit 8: Mean achievement of Class 6 students by language of instruction and language spoken at home

	Student's main language spoken at home is the language of instruction at school (A)	Student's main language spoken at home is different to language of instruction at school (B)	Difference (A–B)	Statistical significance
Mean Mathematics Achievement	202	198	4	–
Mean Reading Achievement	202	198	4	–
Mean Writing Achievement	204	198	6	Δ

School policies

Students attending schools with no monitoring of student attendance had significantly lower levels of reading literacy achievement. The vast majority of schools monitor student attendance.

Students attending schools with no monitoring of teacher attendance had significantly lower levels of mathematical, reading and writing literacy achievement. The vast majority of schools monitor teacher attendance.

Students attending schools with a school improvement plan had higher levels of achievement in mathematical, reading and writing literacy. Almost all students attended schools with improvement plans.

In the school questionnaire, principals were given a series of questions concerning a range of policies that might be in place at their school. These included policies around monitoring student and teacher attendance and about whether the school had a school improvement plan. Some of these policies are likely to be mandated from education departments (either at the national, provincial or district level) and some may be decided at the local school or community level.

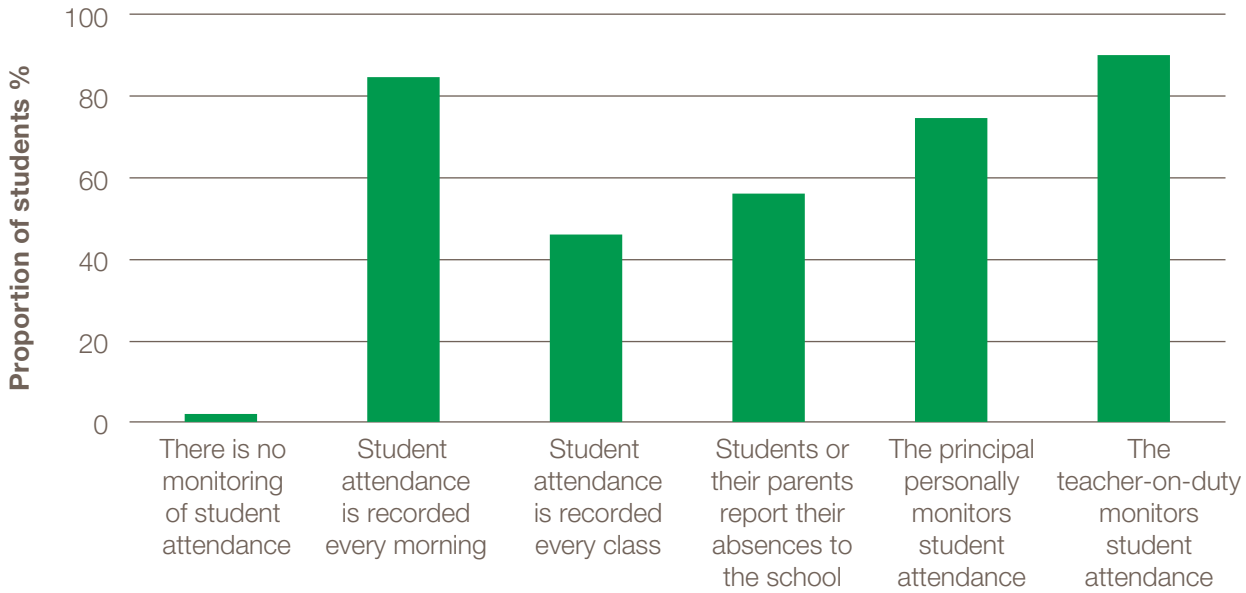
Monitoring of student attendance

Extensive research has established a link between student absenteeism and poor levels of achievement (e.g. OECD, 2013b). Principals were asked to indicate whether student attendance is monitored at their schools, and to choose from options to describe the ways in which it is monitored. The proportions of students who attend schools with each type of student attendance monitoring policy are presented in Exhibit 9 below.

Only two per cent of students attended schools where the principals indicated that there was no monitoring of attendance. On average, these students had lower levels of achievement in writing,[12] but the small number of students attending these schools means that any conclusions must be treated with caution.

The most common methods of monitoring attendance were the teacher-on-duty monitoring student attendance (90% of students) and the student attendance being monitored every morning (85% of students). Less than half of the students (46%) attended schools where their attendance was monitored in every class.

Exhibit 9: Methods of monitoring student attendance at schools



12 Writing scale difference of 11 points

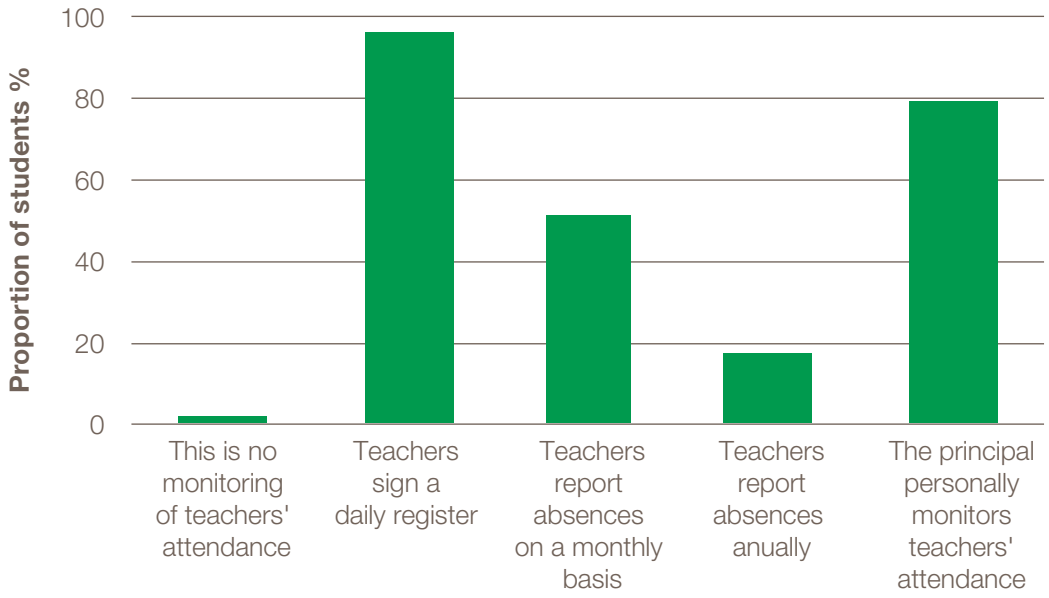
Monitoring of teacher attendance

Principals were also asked to indicate how the attendance of teachers is monitored. The proportion of students attending schools with different monitoring policies in place is presented in Exhibit 10.

Only two per cent of students attended schools where the principal indicated that there is no monitoring of teacher attendance. The most common approaches to teacher monitoring were to ask teachers to sign a daily register (97%) and for principals to personally monitor teacher attendance (79%). Approximately half of students attended schools where teachers report absences on a monthly basis, while relatively few (17%) attended schools where teachers report their absences annually.

Achievement for students attending schools with no monitoring of teacher attendance was compared to students attending schools with teacher attendance monitoring policies (see Exhibit 11). Students attending schools that monitor teacher attendance were more likely to have higher achievement in mathematics, reading and writing literacy.[13] These differences are statistically significant despite the relatively small number of students attending schools with no monitoring policies in place. It should be noted that the schools where teacher attendance was not monitored, tended to have students coming from lower socio-economic backgrounds and fewer resources at the school level.

Exhibit 10: Methods of monitoring teacher attendance at schools



13 Mathematics scale difference of 8 points; Reading scale difference of 11 points; Writing scale difference of 7 points

Exhibit 11: Mean achievement of Class 6 students by presence of teacher attendance monitoring policies at school

	Monitoring of teacher attendance	No monitoring of teacher attendance	Difference Monitoring – No monitoring of teacher attendance	Statistical significance
Mean Mathematics Achievement	200	190	10	Δ
Mean Reading Achievement	199	188	11	Δ
Mean Writing Achievement	199	192	7	Δ

School improvement

Principals were asked whether their school had a school improvement plan. These plans typically set out ways in which different aspects of the school can be enhanced. Almost all students (99%) attended schools with such plans. Despite the finding that students attending schools with improvement plans had higher levels on average in mathematics, reading and writing achievement,[14] it is difficult to make any conclusions based on the small sample of schools without improvement plans.

14 Mathematics scale difference of 5 points; Reading scale difference of 5 points; Writing scale difference of 8 points

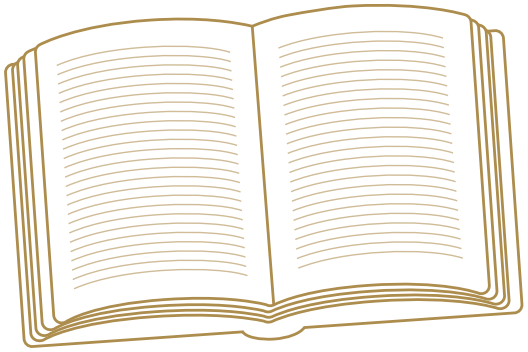
School resources

Large variations were observed in the types of resources available to schools as well as the type and condition of classrooms.

The majority of students had access to their own textbook in class and these students had higher levels of achievement in mathematical, reading and writing literacy.

The presence of school resources that related to basic infrastructure and other miscellaneous school facilities were found to be associated with higher levels of reading and writing achievement in students.

Various international surveys have established that socio-economic factors both for the individual student and the school and community are major factors that can influence student performance (e.g. OECD, 2010, 2013a). Indeed the Class 6 assessment results showed that socio-economic factors were associated with 9% of the variance in mathematics performance and 12% in both reading and writing performance (Routitsky, et al., 2015). The school questionnaire included a series of questions about resources and facilities available to students that would be expected to influence their achievement outcomes.

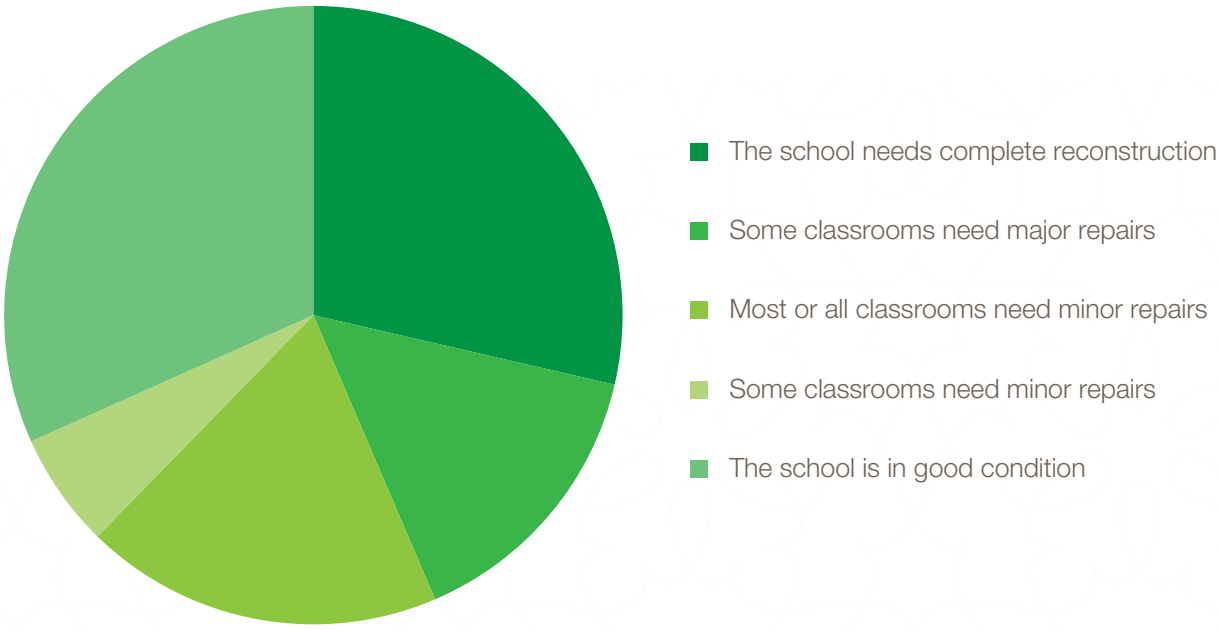


Types and condition of classrooms at school

Principals were asked to indicate the number of classrooms in their school that were permanent classrooms, temporary classrooms and open-air teaching areas. Three-quarters of students (75%) attended schools where the principal indicated there were permanent classrooms. A substantially smaller number of students attended schools where the principal indicated there were open-air teaching areas (38%) and temporary classrooms (21%).

Principals were asked to indicate the general condition of classrooms in their school (if their school has classrooms). They could choose between 'The school needs complete reconstruction', 'Some classrooms need major repairs', 'Most or all classrooms need minor repairs', 'Some classrooms need minor repairs' and 'The school is in good condition'. The proportion of students attending schools per condition category is presented in Exhibit 12.

Exhibit 12: Proportion of Class 6 students attending schools by condition of classrooms



Most students attended schools at the two extreme ends of the response scale. Just under a third of students (32%) attended schools where the school was rated to be in good condition, whereas a slightly smaller percentage attended schools that were rated as needing complete reconstruction (29%). The middle category (most or all classrooms need minor repairs) attracted the next highest proportion of responses (19%).

Mean student achievement in each of the three domains was calculated for each of the five response options and is presented in Exhibit 13. The relationship between achievement and classroom condition appears to show a pattern of students attending schools where the principal indicated the middle category (that most or all classrooms need minor repairs), having lower mean achievement scores than those with classrooms rated as worse or better. It is unclear why this pattern occurred across all three domains, particularly for schools rated as needing major repairs or complete reconstruction.

Exhibit 13: Mean achievement of Class 6 students by condition of school classrooms

	The school needs complete reconstruction	Some classrooms need major repairs	Most or all classrooms need minor repairs	Some classrooms need minor repairs	The school is in good condition
Mean Mathematics Achievement	199	199	192	201	201
Mean Reading Achievement	197	197	192	200	199
Mean Writing Achievement	197	202	194	199	199

Availability of textbooks

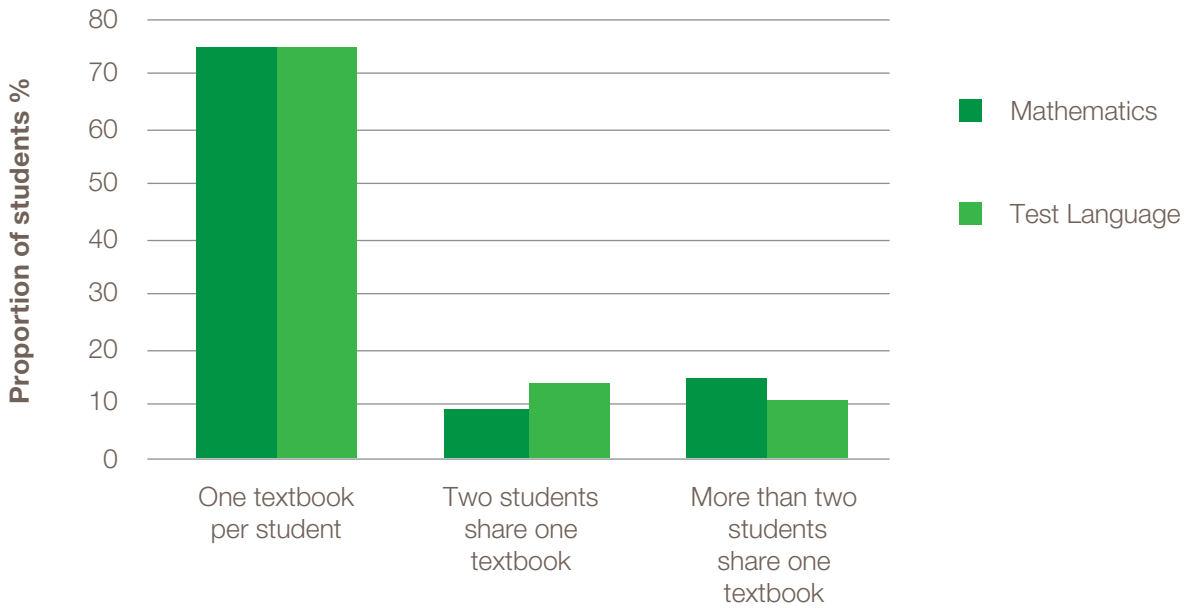
Principals were asked to indicate how many textbooks were available for mathematics and Dari/Pashto[15] subjects in Class 6. Principals identified whether there was one textbook for each student, whether two students share one textbook, or whether more than two students share a textbook.

The proportion of students attending schools for each category of textbook availability is presented in Exhibit 14. Students were more likely to have access to their own textbook than to share a textbook for both mathematics and Dari/Pashto subjects (both 76%). Students were slightly more likely to have to share with two or more students in mathematics (15%) than in Dari/Pashto subjects (11%).

To examine the potential influence of textbook availability on student performance, mean achievement scores were calculated and are presented in Exhibit 15. Achievement is presented in relation to the subject associated with the textbook (i.e. mathematics achievement is in relation to the mathematics textbook and reading and writing achievement is in relation to the Dari/Pashto textbook).

Exhibit 15 shows that when students have access to their own textbooks in class, they are significantly more likely to have higher achievement than if they have to share with other students.

Exhibit 14: Textbook availability for Class 6 mathematics and Dari/Pashto subjects



15 Schools with instruction in Dari were asked about textbook availability for Dari subjects. Schools with instruction in Pashto were asked to indicate textbook availability for Pashto subjects.

Exhibit 15: Mean achievement by subject textbook availability

	One textbook per student	Two or more students per textbook	Difference One textbook per student – Two or more students per textbook	Statistical significance
Mean Mathematics Achievement	202	193	9	Δ
Mean Reading Achievement	202	193	9	Δ
Mean Writing Achievement	200	196	4	Δ

School facilities

Principals were given a list of 25 school facilities and types of equipment and were asked to indicate whether these facilities were present or absent in their school. It was observed that principals tended to group their selection of facilities and equipment. Analyses identified three broad groups that encompassed 21 of the 25 facilities.[16] The three broad groups are described in Exhibit 16.

Exhibit 16: Three broad groupings of school facilities

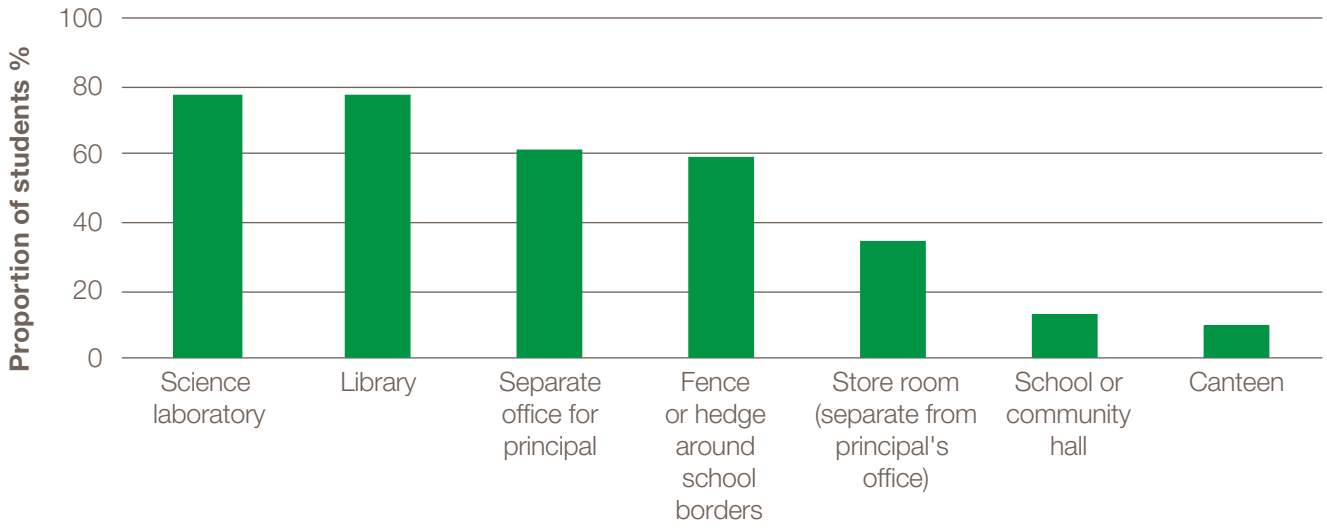
Building facilities	Classroom and administration equipment	Infrastructure for basic needs and miscellaneous
Science laboratory	Typewriter	Prayer room
Library	Radio	First aid kit
School or community hall	Overhead projector	Sports area / playground
Separate office for principal	Television	Piped water / water tank / spring
Store room (separate from principal's office)	Digital Video Disc (DVD) player	Electricity (mains, generator or solar)
Fence or hedge around school borders	Photocopier	Landline telephone
Canteen		Computer
		Internet access

16 Exploratory and confirmatory factor analyses were conducted on the 25 facilities. Full details of these analyses will be included in the technical report. A teacher/staff room, facsimile (fax) machine, tape recorder and a video cassette recorder (VCR) did not form part of the three groups and were excluded from further analyses.

The first group was categorised as 'Building facilities'. The proportions of students that attend schools with each of these types of building facilities are presented in Exhibit 17.

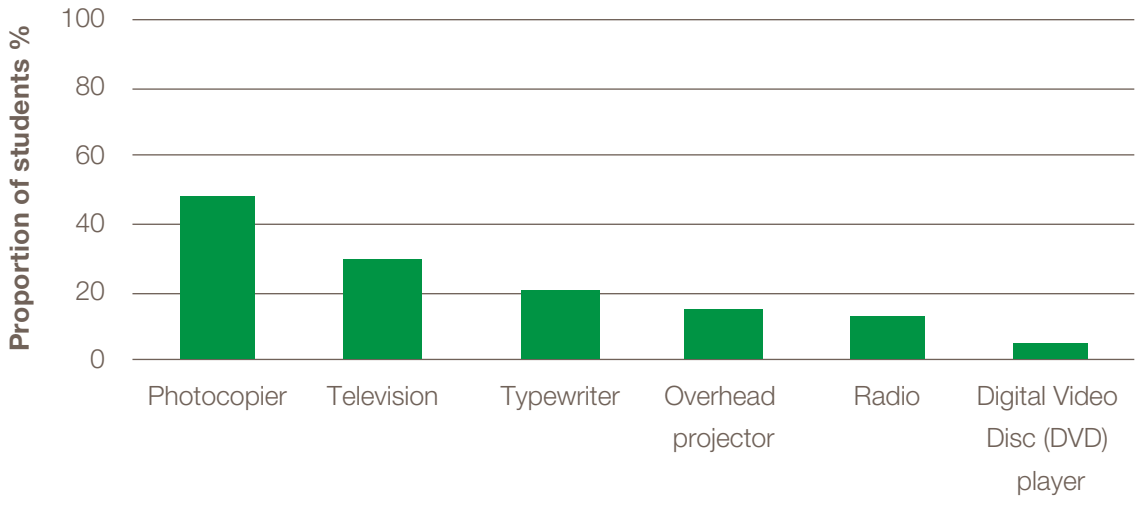
From this group of building facilities, the presence of a science laboratory and a library (78% of students for both) were more common in schools. Having a school or community hall (13% of students) or a canteen (10% of students) was less common.

Exhibit 17: Per cent of Class 6 students attending schools with different building facilities



The second group can be broadly categorised as 'Classroom and administration equipment'. The proportions of students that attend schools with these resources are presented below in Exhibit 18. Of these types of resources, a photocopier was most commonly found in schools (48% of students), followed by a television (29% of students). A Digital Video Disc (DVD) player was less commonly found (5% of students).

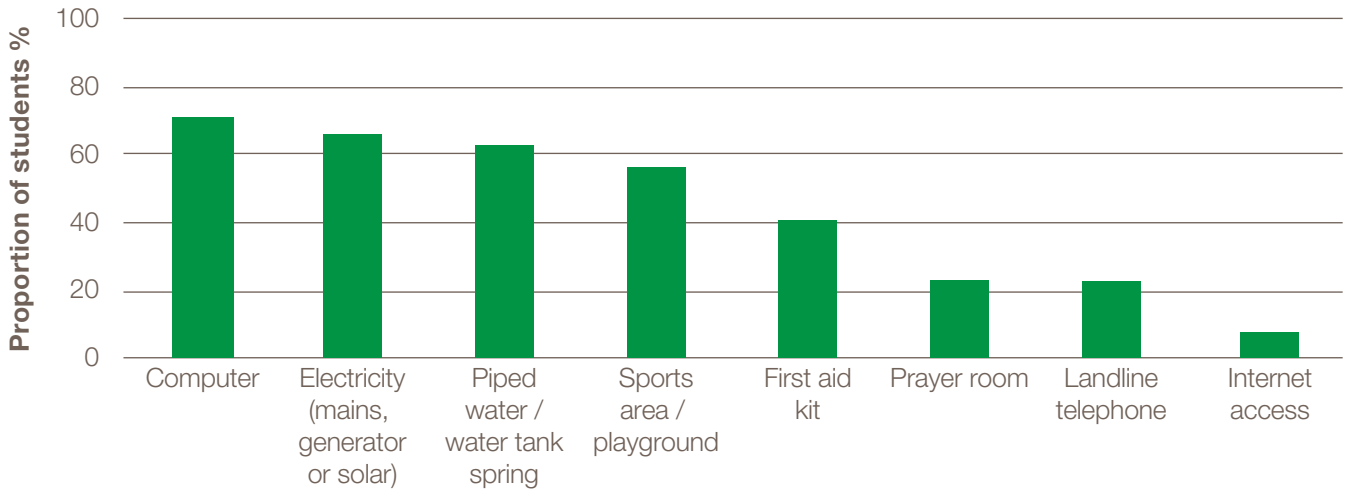
Exhibit 18: Per cent of Class 6 students attending schools with different classroom and administration equipment



The third group includes a greater range of school facilities and types of equipment than the previous two groups. This group can be broadly described as 'Infrastructure for basic needs and other miscellaneous school facilities'. The proportions of students that attend schools with these resources are presented below in Exhibit 19.

The most common facilities present at schools were a computer (71% of students), electricity (66% of students) and piped water (63% of students).[17] Having a landline telephone (22% of students) and internet access (8% of students) were less commonly found.

Exhibit 19: Per cent of Class 6 students attending schools with infrastructure for basic needs and other miscellaneous school facilities



17 Given the mismatch between the numbers of students at schools with computers compared to electricity, it is likely that the presence of computers at schools was over-reported and/or the presence of electricity was under-reported.

The three groups of school facilities and types of equipment were formed into three separate indices. The association between each of these three indices with achievement was examined. Of these three indices, only the last one 'Infrastructure for basic needs and other miscellaneous school facilities' was found to be associated with achievement in reading[18] and writing[19], but not mathematics. No association was found between the first two indices – 'Building facilities' and 'Classroom and administration equipment' – and achievement.

Of the eight resources that make up the index of 'Infrastructure for basic needs and other miscellaneous school facilities', students who attended schools that have a first aid kit[20] and a landline telephone[21] were more likely to have higher achievement in both reading and writing. The presence of these resources should not be seen to somehow of themselves enhance the ability of students. It is more likely that schools that have these types of equipment have greater resources in general to help develop student competencies in the domains assessed.

Students at schools with internet access[22] were more likely to have higher achievement in mathematics, while students at schools with electricity[23] were more likely to have higher achievement in writing.

18 $r = 0.18$

19 $r = 0.17$

20 Reading literacy performance difference of six score points; writing literacy performance difference of seven score points.

21 Reading literacy performance difference of nine score points; writing literacy performance difference of eleven score points.

22 Mathematical literacy performance difference of eight score points.

23 Writing literacy performance difference of eight score points.

Teachers characteristics

No relationship was found between the student–teacher ratio and student achievement.

Students attending schools with higher proportions of teachers with university education had higher levels of achievement in reading.

The students in schools where higher proportions of teachers undertook a program of professional development / in-service training within the last year were more likely to have greater achievement in writing.

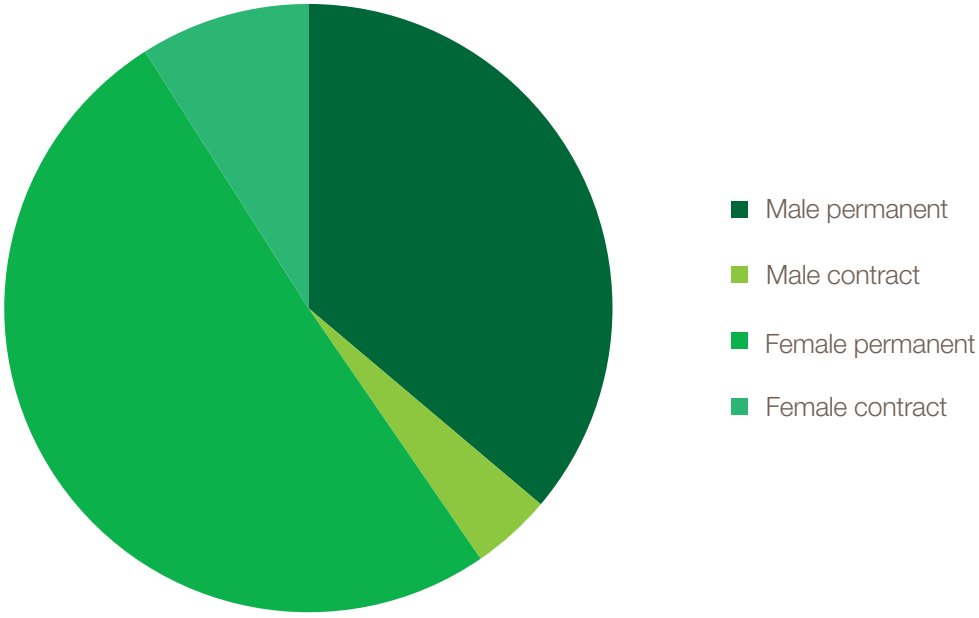
The school questionnaire included questions about the number of teachers in the school, their employment status (permanent or contract), and several questions regarding their education and professional development.

Gender and contract type of teachers in schools

Principals were asked to indicate the numbers of teachers in their school by gender and by their employment status (permanent or contract). The average proportions of teachers at schools in these categories are presented in Exhibit 20.

The data show that female teachers were more common, comprising 60% on average of all teaching staff at schools. Of all teachers that are female, 85% were on a permanent contract. A high proportion of male staff were also on a permanent contract (90%). No relationship was found between teacher gender or contract type and student achievement.

Exhibit 20: Mean proportion of teachers at schools by gender and contract type



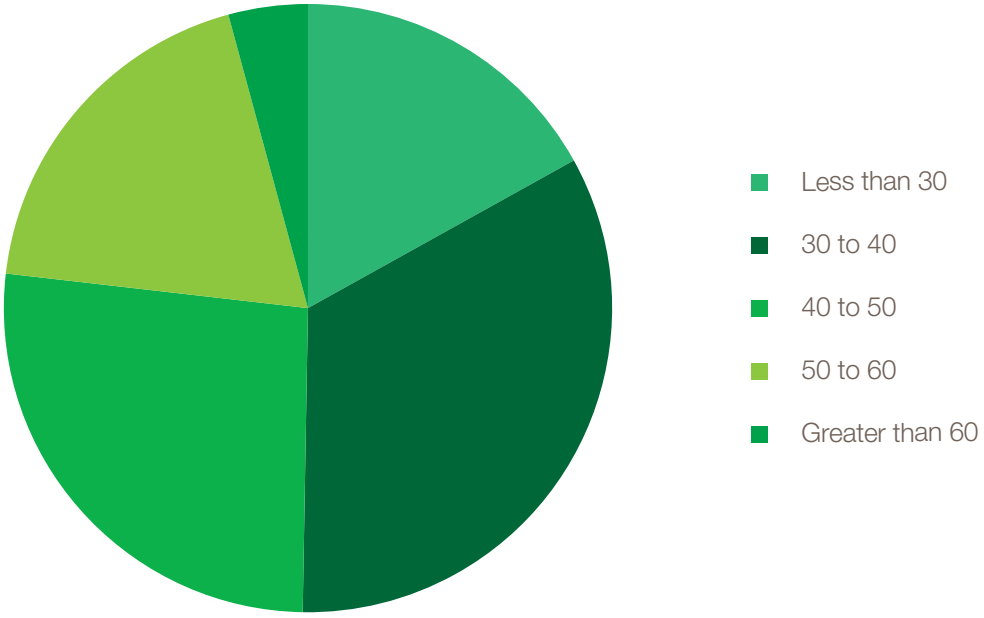
Ratio of teachers to students

Principals provided information on the total number of teachers at the school as well as the total number of students. This data was used to calculate the student–teacher ratio (number of students for each teacher) at each school. These student–teacher ratios for each school were then put into the following groups: less than 30 students per teacher; between 30 and 40 students per teacher; between 40 and 50 students per teacher; between 50 and 60 students per teacher; and more than 60 students per teacher. Exhibit 21 shows the proportions of schools with each of these ratios.

The majority of students experience student–teacher ratios ranging somewhere between 30 students per teacher and 50 students per teacher (60%). Only 17 per cent of students had ratios of less than 30 students to a teacher. Just under a quarter of students were at schools with a ratio of 50 students per teacher or more.

There are mixed findings from previous studies with regards to the relationship between student–teacher ratios and academic performance. PISA 2012 results showed a weak relationship, with some countries actually performing better with more students in the class (OECD, 2013b). Others have shown smaller class sizes have shown to benefit student learning, as each student has greater access to their teacher (e.g. Rivkin, Hanushek, & Kain, 2005). In this study, no relationship was observed between the student–teacher ratio and achievement. However, it is important to note that the measure of student–teacher ratio is a proxy measure, based on the total number of students and teachers in the school. This is likely to be different to the true ratios that exist for Class 6 as it does not take into account the teaching load of teachers (full-time versus part-time), whether there are other non-teaching staff that may be supervising classes (for example, community members in more regional areas), or the ratios that exist in practice for Class 6 students that may be considerably higher or lower on average.

Exhibit 21: Mean proportion of student–teacher ratio at each school



Teacher education

Principals were asked to provide the number of teachers that had completed education for the following levels: 'Grade 6 or lower', 'Grade 7–9', 'Grade 10–12', 'Grade 13–14', 'University degree' and 'Home Islamic education'. Teachers were most commonly educated at the 'Grade 10–12' or 'Grade 13–14' levels, followed by teachers educated at the university level. Relatively fewer teachers were reported to be educated at the 'Grade 6 or lower', 'Grade 7–9' and 'Home Islamic education' levels of education. For each school, a ratio of the number of teachers educated at each level relative to the total number of teachers at the school was calculated. An association was found between the ratio of teachers with university education and reading performance. Students who attended schools with a greater proportion of teachers with university education were more likely to have greater achievement in reading.[24] This reinforces the importance of recruiting educated teachers in increasing student's learning outcomes (e.g. OECD, 2013b). No association was found between the ratio of teachers with other education levels and student performance.

Teacher professional development

Principals were asked to indicate the proportion of teaching staff who attended professional development or in-service training in the last year. Students attending schools with higher proportions of teachers having done a program of professional development / in-service training within the last year were more likely to have greater achievement in writing: there is a weak to moderate correlation.[25] Indeed past studies have shown a relationship between attendance of in-service training and increased student outcomes (Collins, et al., 2012; Ministry of Education Science and Technology of Malawi, 2014). No relationship was found for achievement in mathematics or reading.

24 $r = 0.11$

25 $r = 0.17$

Conclusions and possible policy implications

The results show several school characteristics, policies and resources that are associated with higher achievement levels of students. However, many of the differences observed in student achievement can be explained by the fact that the schools are better resourced and that the students attending these schools tend to come from families that have access to greater resources.

The results demonstrate that supplying schools with greater physical infrastructure, and more importantly, ensuring schools have appropriately trained teachers, would be expected to improve the learning environment for students.

This report has explored data from the Afghanistan Class 6 school questionnaire and investigated the relationship between school-related factors and student achievement.

The data show that:

- Students attending schools in urban settings have higher levels of achievement in reading and writing literacy than students from non-urban settings.
- The greater the distance a student's school from community facilities, especially shopping centres / marketplaces, the more likely it is that the student will have lower achievement in reading and / or writing.
- Students taught in the same language they mainly speak at home are more likely to perform better in writing, but not in reading or mathematics.
- Students from schools that monitored their attendance performed better in reading; students from schools that monitored their teacher's attendance performed better in all three domains. Most schools had some form of student and teacher attendance monitoring.
- Almost all schools had a school improvement plan and students from schools with improvement plans performed better in all three domains than students from schools without improvement plans.
- Students who have access to their own textbook performed better in all three domains than students who shared textbooks.
- Students from schools with greater access to resources related to basic infrastructure and other miscellaneous facilities were more likely to perform better in reading and writing.
- Students who attended schools with a greater proportion of teachers with university education were more likely to perform better in reading.
- Students attending schools with higher proportions of teachers having done a program of professional development / in-service training within the last year were more likely to have greater achievement in writing.

While these findings help in describing the context in which the Class 6 students in Afghanistan are learning, they all, in fact, communicate one underlying message. The main finding from this report is that the association between a range of school-related factors and student achievement is largely attributable to the degree of resourcing available. This includes resources available to the student's school and resources available to the student at home. Differences in achievement reported in each of the sections of this report, including the findings listed above, need to be interpreted with this important consideration in mind.

The idea that better resourced schools tend to have students with higher achievement is certainly not novel, and it is well established in research from developing countries (e.g. Majgaard & Mingat, 2012; Mullis, Martin, Foy, & Drucker, 2012). The idea is two-fold: certainly supplying greater physical infrastructure would be expected to improve the learning environment for students, and basic infrastructure such as electricity, adequate physical classrooms and textbooks, have been shown to be associated with improved achievement outcomes (ACER & ZIMSEC, 2015; Majgaard & Mingat, 2012). However, arguably of greater importance, is the need for improvements in non-physical resources such as ensuring that schools have trained and motivated teachers. This is supported by the findings linking teacher education levels and professional development with positive student outcomes (e.g. Biancarosa, Byrk, & Dexter, 2010; OECD, 2013b). Schools with high achieving students tend to have teachers with higher levels of education that are more likely to have had more teacher training, both at the pre-service and post-service levels. Based on previous studies, a focus on improving this area may well have a greater impact on improving student outcomes than increased physical resources (Collins, et al., 2012; Fraillon, Ainley, Schulz, Friedman, & Gebhardt, 2014; Martin & Mullis, 2013).

Aside from resource allocation, the study also raises the prospect that factors at the school policy level are associated with achievement. Although students attending schools that monitor student or teacher attendance and have a school improvement plan tended to have higher levels of achievement, the limited numbers of students attending schools without such policies means that such an association requires more evidence before any conclusions can be drawn. It may be that identifying policy improvements within schools could have a positive effect on student outcomes that do not necessarily rely on more resourcing for physical and pedagogical improvements.

This study found associations between many school factors and achievement, which became weak or disappeared altogether once the socio-economic background of the student was factored in. Although this is not surprising, it provides a focus for future research. Collecting data from more schools that are representative of a wider range of contexts would provide opportunities for greater insight into school-related factors that might influence student achievement.

References

ACER. (in press). *An assessment framework for monitoring trends in educational growth.* Melbourne: Australian Council for Educational Research.

ACER, & ZIMSEC. (2015). *Evaluation of the Education Development Fund Program – Zimbabwe Early Learning Assessment (ZELA):* 2014 monitoring report.

Afghanistan Ministry of Education. (1390 [2011]). *Afghanistan Education Curriculum.* Kabul: Ministry of Education.

Biancarosa, G., Byrk, A. S., & Dexter, E. R. (2010). Assessing the value-added effects of literacy collaborative professional development on student learning. *The Elementary School Journal*, *111*(1), 7–34.

Collins, P., Galbert, P. D., Hartwell, A., Kochetkova, E., Mulcahy-Dunn, A., Nimbalkar, A., et al. (2012). *Pupil performance, pedagogic practice, and school management: An SSME pilot in Zambia.* North Carolina: RTI International.

Fraillon, J., Ainley, J., Schulz, W., Friedman, T., & Gebhardt, E. (2014). *Preparing for life in a digital age: The IEA International Computer and Information Literacy Study international report.* Cham: Springer.

Lumley, T., Mendelovits, J., Stanyon, R., Turner, R., & Walker, M. (2015). *Class 6 proficiency in Afghanistan 2013.* Melbourne: Australian Council for Educational Research.

Majgaard, K., & Mingat, A. (2012). *Education in Sub-Saharan Africa: A comparative analysis.* Washington, DC: The World Bank.

Martin, M. O., & Mullis, I. (Eds.). (2013). *TIMSS and PIRLS 2011: Relationships among reading, mathematics, and science achievement at the fourth grade – implications for early learning.* Chestnut Hill, MA: Boston College.

Masters, G. N. (1982). A Rasch model for partial credit scoring. *Psychometrika*, *47*(2), 149–174.

Ministry of Education Science and Technology of Malawi. (2014). *Monitoring Learning Achievement in Primary Education Malawi Report.*

Mullis, I. V. S., Martin, M. O., Foy, P., & Drucker, K. T. (2012). *PIRLS 2011 international results in reading.* Chestnut Hill, MA: Boston College.

OECD. (2010). *PISA 2009 results: Overcoming social background: Equity in learning opportunities and outcomes (Volume II)*. Paris: OECD Publishing.

OECD. (2013a). *PISA 2012 results: Excellence through equity: Giving every student the chance to succeed (Volume II).* Paris: OECD Publishing.

OECD. (2013b). *PISA 2012 results: What makes schools succesful: Resources, policies and practices (Volume IV).* Paris: OECD Publishing.

Rasch, G. (1960/1980). *Probabilistic models for some intelligence and attainment tests.* (Copenhagen, Danish Institute for Educational Research) expanded edition (1980) with foreword and afterword by B.D. Wright. Chicago: The University of Chicago Press.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica*, *73*(2), 417–458.

Routitsky, A., Stanyon, R., & Walker, M. (2015). *Class 6 girls and boys in Afghanistan 2013.* Melbourne: Australian Council for Educational Research.

Turner, R. (2014). *The 'literacy' idea.* Melbourne: The Centre for Global Education Monitoring, Australian Council for Educational Research. Available at: http://www.acer.edu.au/files/The_literacy_idea_2014.pdf

Australian Council *for* Educational Research